Chapter 2

Digital Photography and Pre-production

There are three parts in any type of film production process—pre-production, production and post-production.

Pre-production

In the pre-production process, you have to define the message that you would like to convey to the audience, create a story to convey the message, decide your budget, decide your locations for video shooting, determine your video length, decide the characters, determine the equipment you need, and plan the timing of the film. Skipping any of these aspects will cause serious problems later in the production process.

Pre-production in film-making, is the process in which after writing the concept or developing an idea, a story is developed into a script. In a live video film, the script is followed by screenplay writing. The screenplay is followed by cinematography (video shooting) of the script. This sequence of activities falls in the pre-production phase.

In case of an animation film, the development of a storyboard (also called storyboarding or storyboard making) is the pre-production process after scriptwriting. This is followed by animatic design and voice over recording (VOR). If it is a verbal film

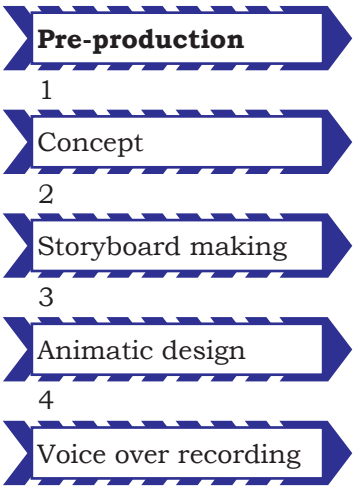

Fig 2.1: Pre-production stages

(dialogue-based animation film), then VOR is done, else storyboard making is the last stage of pre-production. The VOR helps the animator to animate exactly what is required by the script. This is opposite to video film production, where we can shoot the actual footage, which may be 3–4 times the duration of the actual film length. It is important to note that pre-production is the most important process for success in planning a film (Figure 2.1).

Session 1: Camera Angles and Movements

Camera angles and camera movements are combined to create different shots or scenes. A camera is placed in relation to the subject (object to be filmed) in such a way that the viewer perceives the subject and best elaborates the script or storyboard.

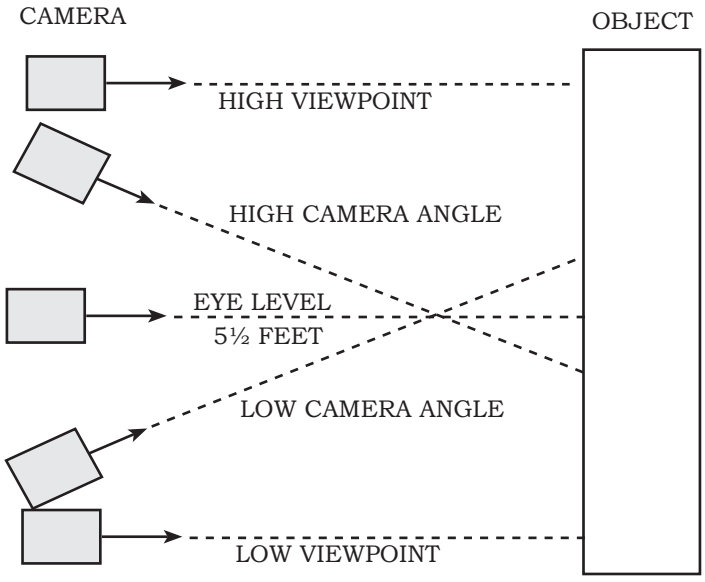

Fig. 2.2: Camera angles

Types of Camera Shots

Camera shots indicating subject size can be divided into Long, Medium and Close.

Long shots (wide shots) show the subject from a distance, emphasising place and location, while a Close shot shows the details of the subject or character. Medium shots place emphasis on the subject, while still showing some of the surrounding environment.

Shots indicating placement of camera in relation to the subject can be categorised into high, low, eye level, bird's-eye view, or worm's-eye view.

A 'viewpoint' is the actual distance and angle from which the camera views and records the subject. It includes the camera's eye level, and point of view shot (Figure 2.2).

In a High-angle (HA) shot, the camera is at a higher level than the subject and is looking down upon it. The high-angle shot can make the subject look smaller. While

a low-angle (LA) shot is taken from a lower height than the subject to make it look threatening, the background of a low angle shot will tend to be just sky or ceiling, with the lack of much detail for viewers. The added height of the object may create a feeling of fear or insecurity in the viewer, who is psychologically dominated by this figure on the screen.

In an Eye level (EL) shot, the camera is placed at the same level of the height as the eyes of the characters in the frame. The camera will be placed at approximately 5–5½ feet from the ground. The shot has little to no psychological effect on the viewer. This shot is taken when the camera is at the level of the subject, or looking straight on to it.

The Bird's-eye view shot shows a scene from the top, looking down directly on the subject below. Familiar objects viewed from this angle might seem totally unrecognisable at first (umbrellas in a crowd, dancers' legs and heads). People can be made to look insignificant or ant-like (of smaller significance). Sir Alfred Joseph Hitchcock, an English film director and producer, and his admirers were fond of this style of shot (which created a feeling of suspense). Hitchcock is regarded as one of the most influential filmmakers in the history of cinema.

Camera Movements

A director of the film uses various camera shots for telling a story— as a series of cuts, going from one shot to another. There are seven basic methods of camera movements.

Pan

It is a camera movement, in which a scene is shot with horizontal movement. The camera is placed on a tripod, which is fixed, i.e., a stationary axis point, as the camera is turned, following a moving object, which is kept in the middle of the composed frame (Figure 2.3).

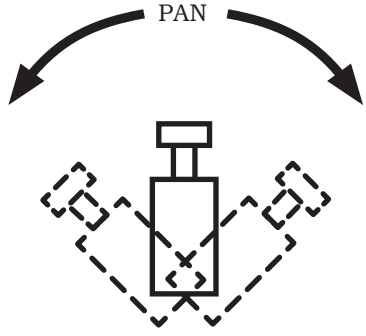

Fig. 2.3: Camera pan angles

Tilt

A movement, wherein a scene is shot vertically up and down, similar to a horizontal 'pan' (Figure 2.4).

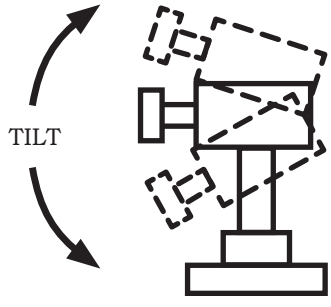

Fig. 2.4: Camera tilt angles

Dolly shots

Dolly shot involves laying a track for the camera which follows the object, hence it is also known as 'tracking' shot. Thus, sometimes it is also called as 'tracking' or 'trucking' shots (tracking the moving object). The camera is placed on a moving vehicle and moves parallel to the action, often following a moving figure or object.

It is, therefore, a shot taken from a moving dolly (a platform with a set of wheels). The camera can be mounted on a car, plane, or even a shopping trolley, or revolving wheelchair. Dolly shot may be a way of recording movement, the journey of a character, or moving in a direction from a long shot to a close-up of an object or subject, which may, gradually, focus on the audience or a particular object or character (Figure 2.5). When the camera moves towards the subject, it is known as 'dolly in.0', and when it moves away from the subject, it is known as 'dolly out.0'.

Fig. 2.5: Dolly shot

Crane shots

It is a moving shot taken from a crane (a mechanical arm which carries both camera and camera operators). A crane (or 'jimmy jib') is a large heavy equipment (Figure 2.6), which is used for moving the camera at very high or very low level, without the camera-person going closer to the object— the whole arm of the jimmy jib can move up, down, left, right, driving in on action, or moving diagonally out of it. The camera-person and

camera are counter-balanced by a heavy weight, and a jib operator needs to take care of the safety of self and others while handling the equipment.

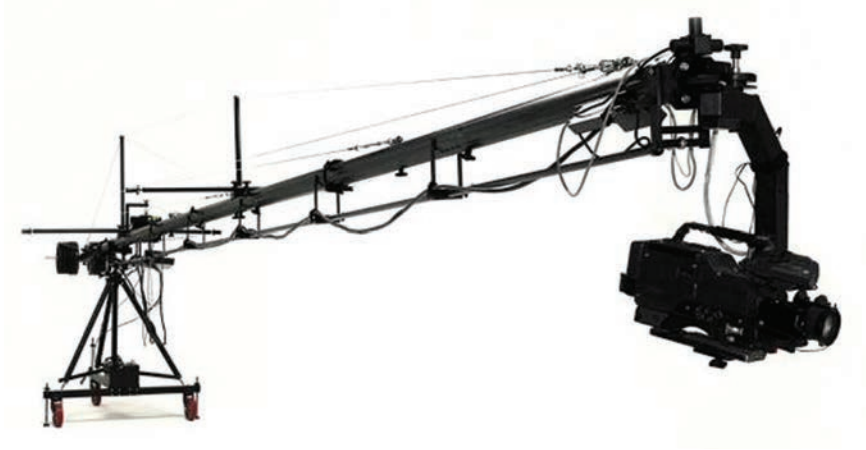

Fig. 2.6: A camera with a crane

Aerial shot

An aerial shot is a shot taken from a flying object such as, helicopter or a drone camera (Figure 2.7).

Fig. 2.7: A drone with a camera for taking aerial shots

Handheld shots

In handheld shot, the camera is held in the camera operator's hands, as opposed to being mounted on a tripod. They can make the audience feel as though they are actually part of a scene, rather than observing it from a detached far away position.

Common Photography Terms

Some of the common photography terms related to camera are given below.

Zoom Lens

A zoom lens has a mechanism that changes the magnification of an image in a camera. While a prime lens (also known as fixed lens) has a fixed focal length, a zoom lens has a variable focal length. Zoom lenses have two specifications that represents two extremes of the zoom range. For example, 70–200 mm range means

Fig. 2.8: Types of zoom lenses

that the lens may act as a 70 mm focal length lens, a 200 mm focal length lens and everything in-between will have variable aperture ranges. It is the photographer who can get a 'close-up' shot while being at some distance from the subject. Zoom lens can make an object appear closer or farther, either quickly (a smash zoom) or slowly, without moving the camera even an inch, thus, saving time and hassle. Zoom lenses are extensively used by directors, who try to give the impression of movement and excitement in a scene while it actually does not exist. One must use zoom lenses with caution and on a tripod to avoid hazy pictures (Figure 2.8).

Aperture

Aperture is the size of the opening in lens (Figure 2.9). Think of the lens as a window—a wide open window that lets in more light, while a little open (largely closed) window lets in less light. A wide open aperture will allow more light to fall on an image for a brighter photo, while a smaller aperture lets in less light.

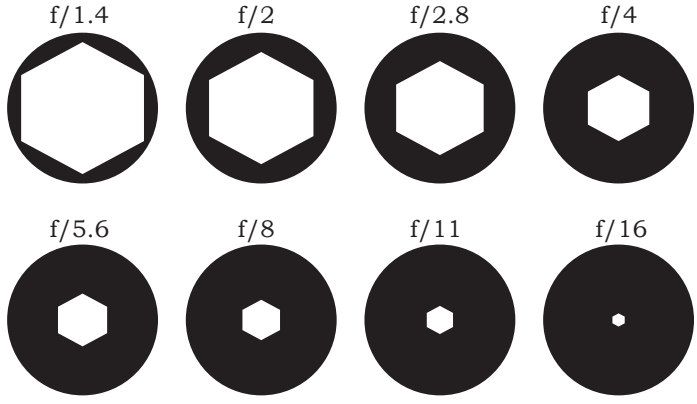

Fig. 2.9: Aperture size

A diaphragm of a camera consists of overlapping metal blades (the iris) that open and close to change the size of the opening, which is required for controlling the aperture and depth of field of an image.

Aperture is measured in f-stops. The aperture of a lens is the diameter of the open circle or diaphragm inside a lens. This diameter is expressed as f-number, such as f/1.4 or f/16. The lower the f-number, the wider the aperture. The wider the aperture, the more light gets into the sensor. A small f-stop like f/1.8 means

a wide opening, while a large f-stop like f/22 is a very narrow opening. Aperture is one of the three camera settings that determines an image exposure, or how light or dark it is. Aperture also affects how much of the image is in focus—wide apertures result in creamy, unfocused background, while narrow ones keep the image sharp.

Aspect ratio

It is the ratio of the projected image's width to its height. A 1:1 ratio means that an image's width and height are equal, thus creating a square. A6×4 inch image has an aspect ratio of 3:2, which is there in 35 mm Film DSLR Cameras and Smartphones. A 4:3 ratio is used for television displays, computer monitors, and digital cameras. The 16:9 ratio is mostly seen on presentation slides, computer monitors, or widescreen HDTVs (Figure 2.10).

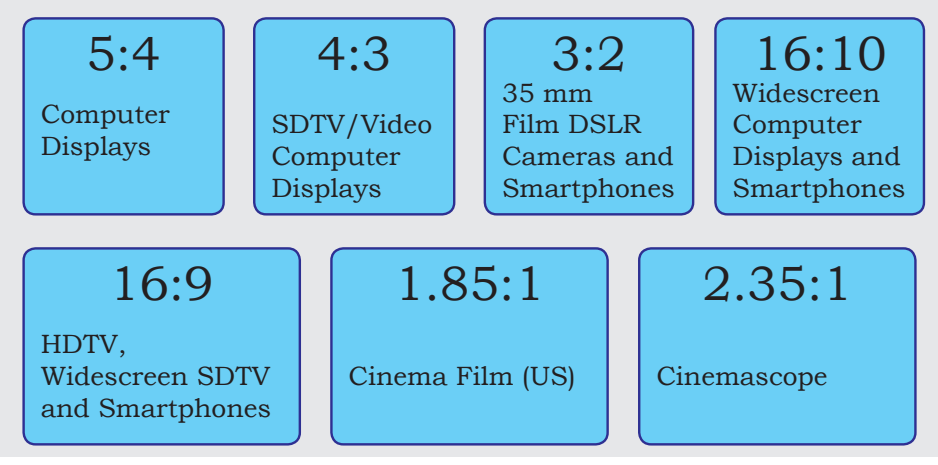

Fig. 2.10: Aspect ratio in photography

Burst mode

You can take photos one at a time, or can turn the burst mode on and the camera will continue snapping photos as long as you hold the button down, or until the buffer is full. Burst speed differs based on what camera you own, some are faster than others. It depends on how fast it occurs and it is written in 'fps' or frames (pictures) per second (Figure 2.11).

Fig 2.11: An example of burst mode

Depth of field (DoF)

Depth of field refers to how much of an image is in focus. The camera will focus on one distance, but there is a range of distance in front and behind that point that stays sharp—this is known as depth of field. Portraits often have a soft, unfocused background—this is a shallow depth of field. Landscapes, on the other hand, often have more of the image in focus—this is a large depth of field (Figure 2.12).

Fig. 2.12: Depth of field

Digital and optical

Digital and optical are important terms to understand when shopping for a new camera. Digital means the effect achieved through software, and not the physical parts of a camera. Optical is always better than digital. These terms are, usually, used when referring to zoom (in a compact camera), as well as image stabilisation (Figure 2.13).

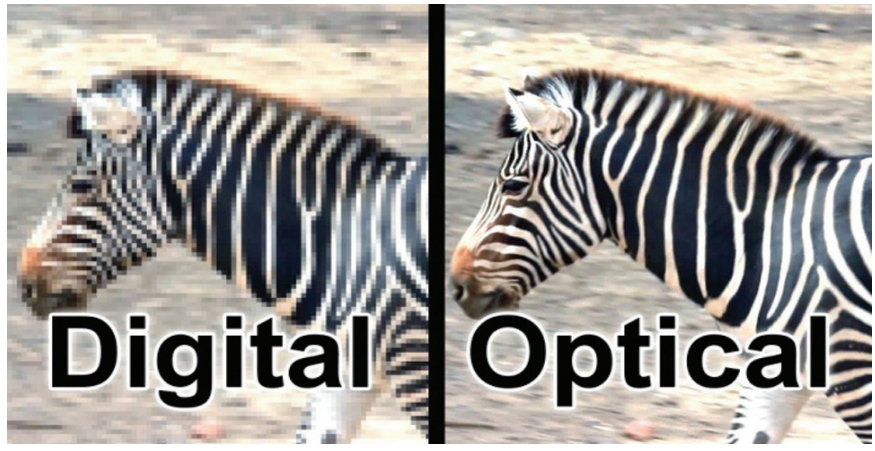

Fig. 2.13: A picture explaining digital versus optical zoom concept

Exposure

An image is created when the camera sensor (or film strip) is exposed to light. Exposure is how light or dark an image is. A dark photo is considered underexposed or not exposed to enough light. A light photo is overexposed or exposed to too much light. Exposure is mainly controlled through aperture and shutter speed. The shutter speed or exposure time is the length of time when the digital sensor in the camera is exposed to light. It is also the time when a camera shutter is open while taking a photograph. It is indicated as f-stop (Figure 2.14). Aperture controls the depth-of-field, which is what is in focus in the picture. Aperture can be used to draw attention to one subject by blurring the background with a wide aperture (Figure 2.15).

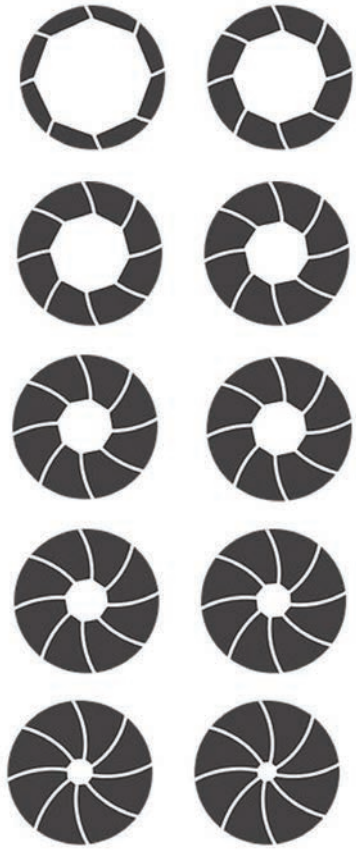

Fig. 2.14: Wide to narrow aperture

Fig. 2.15: Use of aperture to draw attention to one subject

Exposure compensation

Exposure compensation is a way to tell the camera that you would like the exposure to be lighter or darker. It is measured in stops. A single stop represents doubling of the amount of light hitting the sensor. Exposure compensation gives you the ability to change the shutter speed while staying at the same aperture you have originally set. In Aperture (A) Priority mode, exposure

compensation changes the shutter speed, whereas in Shutter (S) Priority mode, exposure compensation changes the size of your aperture. In Programme (P) mode, exposure compensation changes the shutter speed (Figure 2.16).

Fig. 2.16: Exposure compensation

Exposure bracketing

In exposure bracketing, the camera is set to take multiple pictures in a row, with the first at normal exposure, the next one underexposed, and the final one overexposed (Figure 2.17).

Fig. 2.17: Exposure bracketing

Focus

When your eyes focus on a closer object, the objects far away will appear blurry. 'Focus', a common photography term, has the same meaning. Something that is in focus is sharp, while an object that is out-of-focus, is not sharp. Different focus areas determine if the camera is focusing on multiple points or one user-selected point. An image that is completely sharp is said to be in-focus. An image that's completely blurry is said to be unfocused. The icon usually used for focus is shown in Figure 2.18.

Fig. 2.18: Icon of Focus

Histogram

A histogram is a graph that shows frequency of anything. Usually histogram have bars that represent frequency of occurring of data in the whole data set. The image is made up of millions of pixels and each pixel has a value representing its colour. The pixel's brightness is derived from this value. A histogram is a graph, which you can see on your camera, and it tells you about the distribution of light in an image. The scale of the histogram goes from left to right i.e. from 0% brightness (black) to 100% brightness (white). A histogram has two axis— the *x* axis and the *y* axis. The *x* axis contains the event, the frequency of which you have to count, and the *y* axis contains frequency.

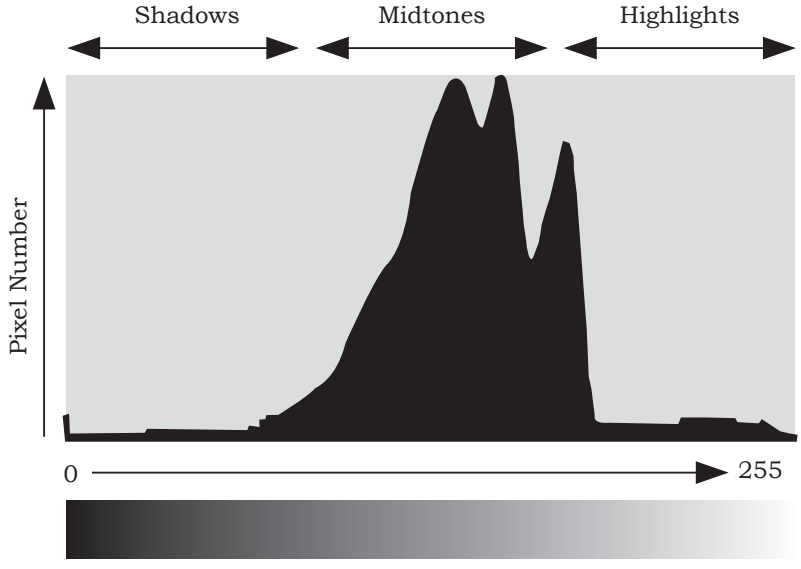

Figure 2.19: A view of histogram

The different heights of bar show different frequency of the occurrence of data. The *x* axis shows the grey level intensities and the *y* axis shows the frequency of these intensities. If the chart peaks towards the left, the image has a lot of dark hues. If it peaks to the right, the image has a lot of light hues. If those peaks are cut off at the edges, the image is underexposed (on the

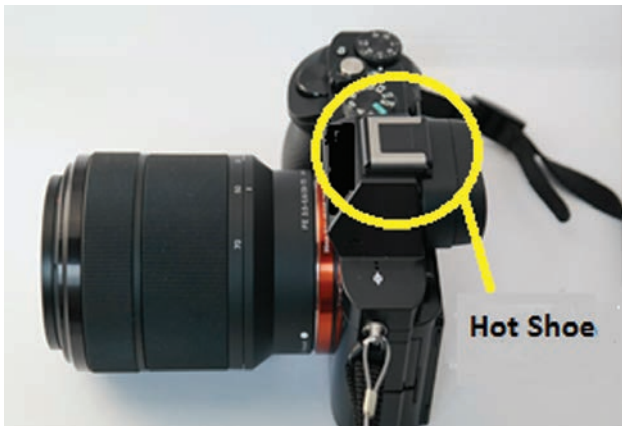

Fig. 2.20: Hot shoe

left edge) or overexposed (on the right edge). It is, therefore, used in adjusting the contrast of an image and equalise an image (Figure 2.19). A histogram is something that the beginners must learn after understanding manual modes.

Hot shoe

Hot shoe (Figure 2.20) is the slot at the top of a camera for attaching hot shoe flash or other accessories. The flash unit creates a circuit between the shoe and the contacts. Once the circuit is complete, the flash will fire as the shutter is pressed.

ISO (International Organisation for Standardisation)

In digital photography, ISO measures the sensitivity of the image sensor or film inside the camera. This measure of sensitivity is expressed as ISO speed. The ISO speed of film or digital camera sensors is derived from standards adopted by the International Organisation for Standardisation. For example, an ISO of 100 means the camera is not very sensitive for shooting in daylight. An ISO of 3200 means the camera is very sensitive to light. Therefore, a camera with higher ISO can be used for getting shots in low light. The trade-off is that, images at high ISOs appear to be grainy and have less detail. ISO is balanced with aperture and shutter speed to get a proper exposure.

Cameras have different range of ISO values that you can use. A common set of ISOs are as follows:

- ISO 100 (low ISO)
- ISO 200
- ISO 400
- ISO 800
- ISO 1600
- ISO 3200
- ISO 6400 (high ISO)

Long exposure

Long exposure refers to an image exposed to light for a long time or the one that uses a long shutter speed. This technique is useful for shooting still objects in low light. Long exposure night photography can produce better results.

Manual mode

Manual mode allows a photographer to set the exposure instead of having the camera do it automatically. In manual mode, you choose the aperture, shutter speed and ISO, and those choices affect how light or dark an image will be. Semi-manual modes include aperture priority (where you only choose the aperture), shutter priority (where you only choose the shutter speed) and programmed auto (where you choose a combination of aperture and shutter speed together instead of setting them individually). Manual mode thus allows you to select an aperture value and shutter speed value manually.

Image noise

Image noise is a random variation of brightness or colour information in images. Images will show more noise in the shadow areas than in lighter parts. Images taken at high ISOs have a lot of noise, so it is best to use the lowest ISO. There are softwares which can be used for noise reduction.

RAW

RAW is a file type and is considered as the best form of image file, since it does not process the picture, leaving total control of editing to the user. RAW file size is much larger than jpeg files, but is smaller than tif files.

Rule of thirds

'Rule of thirds' is a compositional rule, which is applied by imagining that the image is divided into three parts, both horizontally and vertically. Often the most interesting compositions result in placing the subject on one of the intersections of those imaginary lines,

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Fig. 2.21: Application of Rule of Thirds

instead in the centre of the photo. It is one of the most well-known rules of photography as it forms the basis for balanced and creative shots (Figure 2.21).

Shutter speed

Shutter is that part of the camera, which opens and closes to allow light in and take a picture. Shutter speed refers to how long the shutter stays open. Shutter speed is typically measured in fractions of a second. The longer the shutter stays open, the more the light is let in. But anything that moves while the shutter is open will become blur, and if the entire camera moves while the shutter is open, the whole image will be blurry. That is why, tripods are necessary for longer shutter speeds.

Shutter release

It is the push button that you press on the camera to take a picture. When the button is pressed, the shutter of the camera is released, so that it opens to capture a picture, and then closes, allowing an exposure time as determined by the shutter speed setting.

Time lapse

Time lapse is a video created by stitching several photos of the same thing taken at different times together. Time lapse is not to be confused with long exposure, which is a single image with long shutter speed.

Fig. 2.22: Viewfinder

Viewfinder

It is the hole from where one looks through to take a picture. Some digital cameras do not have this and have a screen instead. But all Digital Single Lens Reflex Cameras (DSLRs) and most mirror-less cameras use viewfinders (Figure 2.22).

White balance

Your eyes automatically adjust to different light sources but a camera cannot do that. That is why, sometimes, when you take an image, it looks blue or yellow. White balance is a camera setting that adjusts the colour balance of light (Figure 2.23). All digital cameras have an auto white balance setting that analyses the colours in a scene and neutralises them automatically. But like any automatic setting, it is not always accurate. This is why cameras also offer manual white balance presets that you can choose to match the conditions. You can use a pre-set based on what light you are shooting in, like daylight or tungsten.

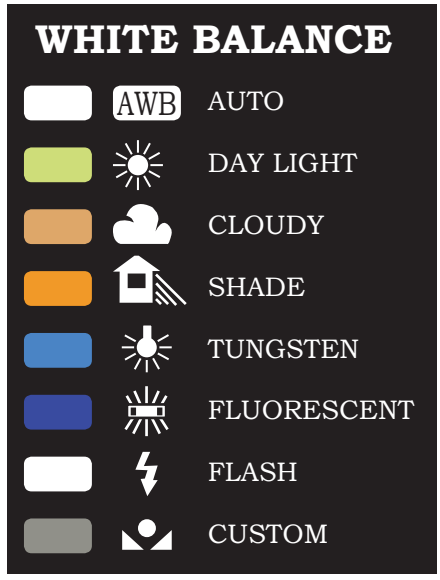

Fig. 2.23: White balance settings

Practical Exercises

Activity 1

Understanding camera angles

Material required

DSLR Camera

Procedure

- Click photos with different camera angles using a DSLR camera and observe the differences.
- To begin with you may click horizontal or landscape photos, vertical or portrait photos, etc.
- Now try the different camera angles, such as high level, low level, bird's eye view and eye level.
- Make a note of your observations and include the photos in your portfolio.

Check Your Progress

A. Fill in the Blanks

1. A _____ shot is one in which the camera is physically at a higher level than the subject.
2. A _____ shot is taken from a lower level than the subject and has the power to make the subject look powerful or threatening.

3. An _____ shot is taken at the level of the subject. Here, the camera looks straight at the subject.
4. The _____ view shot shows a scene from the top level, looking down directly on the subject below.
5. A _____ shot makes the object clicked seem smaller and less significant.
6. In _____ camera movement, a scene is shot with horizontal movement.
7. In _____ camera movement, a scene is shot vertically up and down, similar to a horizontal pan.
8. In _____ shot, the camera moves alongside the subject it is recording.
9. A _____ lens has a mechanism that changes the magnification of an image.
10. Aperture is the _____ of the opening in the lens.
11. Depth of field is a term in photography that refers to how much of the image is in _____.
12. _____ is how light or dark an image is.
13. _____ shoe is the slot at the top of a camera for adding accessories.
14. The ISO determines how sensitive the camera is to _____.
15. A long exposure is an image that has been exposed to light for a long time or uses a long _____ speed.

B. Subjective Questions

1. Write short notes on the following:
   (a) Aperture
   (b) Exposure
   (c) Focus
   (d) Depth of field
2. What is the difference between crane shot and aerial shot?

What have you learnt?

On the completion of this Session, you will be able to:

- describe the pre-production steps;
- identify the various types of camera shots and camera movements;
- describe the purpose of Zoom lens;
- explain aspect ratio in photography; and
- describe the meaning of various terms related to exposure in photography.

Session 2: Pre-production

Notes

Pre-production is a phase that involves development of ideas and planning prior to the process of production. In an action movie, it is the period before the filming actually starts. In an animation film, it is the period before real animation takes place.

The success of a project lies in 'planning'. This Session gives an overview of the different steps involved in the pre-production process and how each step helps to develop a roadmap on which to base the further production stages. Although there is a general sequence of events in pre-production, it is normal for various stages to be revisited more than once. Having the insight, discipline, and patience to recognise and make changes when appropriate, is a key quality for anyone working on animation.

Storyboard

A 'storyboard' is a sequence of drawings that is used to help communicate ideas and messages. It includes a series of drawings and pictures with some directions and dialogues. It describes the events and scenes, often accompanied by text notes, describing what is occurring in the scene. Storyboards may also include lighting and camera movements to describe the frame in detail. The idea of storyboarding was developed at the Walt Disney Studio during the early 1930s. The first complete storyboards were created for the 1933 Disney short movie 'Three Little Pigs' (*The Story of Walt Disney*, Henry Holt, 1956).

A film storyboard is a series of frames with drawings in the sequence of events taking place in the film. It helps film directors and cinematographers to visualise the scenes and find basic requirements and potential problems before the shooting of the film. A detailed storyboard may also help in estimating the cost of the overall production of the film.

Character Design

Character design includes developing the appearance and features of characters in an animation (Figure 2.24). Often, an actual model is produced using modeling

clay in order to get a better idea of the appearance of a character.

Fig. 2.24: Character designing

Model sheets

Model sheets are drawings of posed cartoon or comic spip characters that are created to provide a reference template for production of art or comic book or video. 'Model sheets' are produced to help animators work on the appearance of characters. These sheets help animators to understand the character details. 'Character line-up sheets' are also produced to compare the scale of the characters against one another.

Expression sheets

Expression sheets serves as a guide for the facial expressions of a character, such as smile, laugh, sad, shocked, startled, sleepy, alert, thoughtful and concerned (Figure 2.25).

Fig. 2.25: Expression sheet

Animatics

Animatics are used for pre-visualising the film before the actual production starts. You may consider it as storyboards that are brought to life using animation and sound. It is made up of individual frames taken from the storyboard. Each frame depicts a certain key point

of a scene or movie, which is accompanied by audio, sound effects and music.

Practical Exercise

Activity 1

Make a storyboard.

Material Required

Storyboard sheets or chart papers, thumbnail sheets, board, writing material.

Procedure

- Make a list of the main events of the story.
- Arrange them in the order in which the story will be told through the storyboard.
- Draw or pick scenes that show the plot developing from start to finish. Scenes could be about plot twists, showing different settings, character development, etc.
- Show the turning points of the scenes as it brings about curiosity amongst the learners.
- Write a description of what each cell will show so that it can be converted into dialogue. You might want to have a cell that shows a conversation between two characters. You can show characters fighting, smiling, or moving. Show the background behind the characters.
- Also mention the composition for each cell, which may include lighting, colour palette, etc. Props (objects in the frame) and special effects may also be included.
- You may also mention the angle from which the camera will be shooting (high, low, dolly shot, wide shot, tracking shot, etc.)
- Show your storyboard to the teacher and take feedback for improvement.
- You may use the pictures given below to start your storyboard.

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Check Your Progress

A. Fill in the Blanks

1. Pre-production is a phase that involves further developing of ideas and planning prior to the process of _____.
2. A _____ is a sequence of drawings that is used to help visualise the animation and to communicate ideas clearly.
3. A _____ contains key events and scene changes in the animation, and is often accompanied by text notes, describing what is occurring in a scene, such as camera movements.
4. Character _____ involves developing the appearance and features of characters in an animation.
5. _____ sheets are produced to help animators work on the appearance of characters.
6. An animatic is a timed moving version of the _____.

B. Match the Columns

Column A	Column B
1. Storyboarding	(a) It is a timed moving version of the storyboard, made up of individual frames taken from the storyboard.
2. Model sheets	(b) These are precisely drawn groups of pictures that show all of the possible expressions that a character can make.
3. Animatics	(c) It is a sequence of illustrations and images for the purpose of visualising animation or a motion picture.

C. Subjective Questions

1. Write a short note on character design and animatic.
2. Differentiate between storyboard and animatic.

What have you learnt?

On the completion of this Session, you will be able to:

- demonstrate the knowledge of the process of pre-production.
- describe the importance of storyboard in pre-production process.
- identify the elements of a story.
- generate ideas for drawing characters for a storyboard.